

## CLAIMS

1. A micro-adjustable tool chuck comprising a first cylindrical body member (1) adapted for connection to a drive spindle, a second cylindrical body member (2) adapted to receive a tool bit in the end thereof and moveable axially relative to the first body member (1), and means (8) for drivingly connecting the first body member (1) to the second body member (2), wherein a first screw thread (10) is formed on the outer surface of the first body member (1), a second screw thread (11) is formed on the outer surface of the second body member (2), the first screw thread (10) being of a greater pitch (coarser) than the second screw thread (11) and wherein an outer sleeve (12) is provided around the first and second body members (1,2), the outer sleeve (12) defining a third screw thread (13) on the inner surface thereof at one end which engages with the said first screw thread (10) and a fourth screw thread (14) on the inner surface thereof at the opposite end which engages with the second screw thread (11) such that rotation of the outer sleeve (12) in one direction causes the first and second body members (1,2) to move axially towards each other and rotation of the outer sleeve (12) in the opposite direction causes the first and second body members (1,2) to move axially away from each other.

2. A micro-adjustable tool chuck according to claim 1, wherein the first and second body members (1,2) are drivingly connected together by means of a splined or keyed spigot (8) which is received in a splined or keyed bore and which is able to slide axially in the splined or keyed bore.

3. A micro-adjustable tool chuck according to claim 1 or 2, wherein the first body member (1) comprises a tapered spigot at the upper end thereof which is adapted to drivingly connect the tool chuck to a drive spindle.

4. A micro-adjustable tool chuck according to claim 1, 2 or 3, wherein the second body member (2) comprises a collet (5) in the bottom thereof having a bore therein in which a tool bit is received and a nut (7) for tightening the collet (5) to secure the tool bit therein.

5. A micro-adjustable tool chuck according to claim 1, 2, 3 or 4, further comprising locking means (15,16) for preventing rotation of the outer sleeve (12) relative to the first and second body members (1,2) and thereby preventing axial movement of the first and second body members (1,2) relative to one another.

5 6. A micro-adjustable tool chuck according to claim 5, wherein the locking means comprises one or more ball bearings (15) each of which is retained in a respective hole in the outer sleeve (12) and each of which is selectively engageable in a respective axially extending groove in the outer surface of the first or second body member (1,2).

10 7. A micro-adjustable tool chuck according to claim 6, wherein each ball bearing is retained in its respective hole in the outer sleeve (12) by a retaining sleeve (16) which is moveable relative to the outer sleeve (12), and which has a groove or slot (17) on the inner surface thereof which when aligned with the hole in the outer sleeve (12) allows the ball bearing (15) therein to disengage from the groove in the outer surface of the first or second body member (1,2).

15 8. A micro-adjustable tool chuck according to claim 6 or 7, wherein the angular distance between each of the axially extending grooves or slots in the outer surface of the first or second body members (1,2) represents a predetermined axial displacement of the second body member (2), and of the end of a tool bit secured therein, relative to the first body member (1).

20 9. A micro-adjustable tool chuck according to claim 8, wherein there are five equi-angularly spaced axially extending grooves or slots in the outer surface of the first or second body members (1,2) and the distance between each of these represents a tool axial displacement of 0.1mm.

25 10. A multi-spindle CNC machine comprising for each spindle a magazine of tool bits, wherein each tool bit is mounted in a tool chuck which is adapted to operatively engage with a spindle and wherein one or more of the tool chucks comprises a micro-adjustable tool chuck in accordance with any one of claims 1 to 9.

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